

CLAIMS

1. A thin film transistor comprising:
an insulating layer having a first opening;
5 a first conductive layer in the opening; and
a second conductive layer on the insulating layer and the
first conductive layer,
wherein the first conductive layer is wider and thicker
than the second conductive layer.
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2. A thin film transistor comprising:
an insulating layer having a first opening;
a first conductive layer in the opening; and
a second conductive layer on the insulating layer and the
15 first conductive layer,
wherein the first conductive layer is wider and thicker
than the second conductive layer, and
wherein the second conductive layer is formed by a droplet
discharge method using a conductive material.
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3. A display device comprising:
a first insulating layer having a first opening;
a first conductive layer in the first opening;
a second conductive layer on the first insulating layer
25 and the first conductive layer;
a semiconductor layer over the second conductive layer
with a gate insulating film therebetween;
a third conductive layer over the semiconductor layer;
a second insulating layer having a second opening over
30 the third conductive layer; and

a fourth conductive layer in the second opening,
wherein the first conductive layer is wider and thicker
than the second conductive layer, and

wherein the fourth conductive layer is thicker than the
5 third conductive layer.

4. A display device comprising:

a first insulating layer having a first opening;

a first conductive layer in the first opening;

10 a second conductive layer on the first insulating layer
and the first conductive layer;

a semiconductor layer over the second conductive layer
with a gate insulating film therebetween;

a third conductive layer over the semiconductor layer;

15 a second insulating layer having a second opening over
the third conductive layer; and

a fourth conductive layer in the second opening,

wherein the first conductive layer is wider and thicker
than the second conductive layer,

20 wherein the fourth conductive layer is thicker than the
third conductive layer, and

wherein each of the second conductive layer and the third
conductive layer is formed by a droplet discharge method using
a conductive material.

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5. A display device comprising:

a first insulating layer having a first opening;

a first conductive layer in the first opening;

a second conductive layer on the first insulating layer

30 and the first conductive layer;

a semiconductor layer over the second conductive layer with a gate insulating film therebetween;

a pair of third conductive layers over the semiconductor layer;

5 a first electrode over one of the pair of third conductive layers;

an electroluminescent layer over the first electrode; and

a second electrode over the electroluminescent layer,

10 wherein the first conductive layer is wider and thicker than the second conductive layer.

6. A display device comprising:

a first insulating layer having a first opening;

a first conductive layer in the first opening;

15 a second conductive layer on the first insulating layer and the first conductive layer;

a semiconductor layer over the second conductive layer with a gate insulating film therebetween;

20 a pair of third conductive layers over the semiconductor layer;

a first electrode over one of the pair of third conductive layers;

an electroluminescent layer over the first electrode; and

25 a second electrode over the electroluminescent layer, wherein the first conductive layer is wider and thicker than the second conductive layer, and

wherein the second conductive layer is formed by a droplet discharge method using a conductive material.

7. A display device comprising:

a first insulating layer having a first opening;

a first conductive layer in the first opening;

5 a second conductive layer on the insulating layer and the first conductive layer;

a semiconductor layer over the second conductive layer with a gate insulating film therebetween;

a pair of third conductive layers over the semiconductor layer;

10 a first electrode over one of the pair of third conductive layers;

a second insulating layer having a second opening over the other one of the pair of third conductive layers;

a fourth conductive layer in the second opening;

15 an electroluminescent layer over the first electrode; and a second electrode over the electroluminescent layer, wherein the first conductive layer is wider and thicker than the second conductive layer, and

20 wherein the fourth conductive layer is thicker than the third conductive layer.

8. A display device comprising:

a first insulating layer having a first opening;

a first conductive layer in the first opening;

25 a second conductive layer on the first insulating layer and the first conductive layer;

a semiconductor layer over the second conductive layer with a gate insulating film therebetween;

30 a pair of third conductive layers over the semiconductor layer;

a first electrode over one of the pair of third conductive layers;

a second insulating layer having a second opening over the other one of the pair of third conductive layers;

5 a fourth conductive layer in the second opening;
an electroluminescent layer over the first electrode; and
a second electrode over the electroluminescent layer,
wherein the first conductive layer is wider and thicker
than the second conductive layer,

10 wherein the fourth conductive layer is thicker than the third conductive layer, and

wherein each of the second conductive layer and the third conductive layer is formed by a droplet discharge method using a conductive material.

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9. The thin film transistor or the display device according to any one of claims 1 to 8, wherein the thin film transistor or the display device further comprises a titanium oxide film below the first conductive layer.

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10. The thin film transistor or the display device according to any one of claims 1 to 8, wherein the thin film transistor or the display device further comprises a film comprising at least one selected from the group consisting of
25 W (tungsten), Al (aluminum), Ta (tantalum), Zr (zirconium), Hf (hafnium), Ir (iridium), Nb (niobium), Pd (lead), Pt (platinum), Mo (molybdenum), Rh (rhodium), Sc (scandium), Ti (titanium), V (vanadium), Cr (chromium), Mn (manganese), Fe (iron), Co (cobalt), Ni (nickel), Cu (copper), and Zn (zinc) below the
30 first conductive layer.

11 The thin film transistor or the display device according to any one of claims 1 to 8, wherein the second conductive layer includes at least one of silver, gold, copper, and indium tin oxide.

12. The display device according to any one of claims 3 to 8, wherein the third conductive layer includes at least one of silver, gold, copper, and indium tin oxide.

13. The thin film transistor or the display device according to any one of claims 1 to 8, wherein a width of the first opening is from 5 μm to 100 μm .

14. The display device according to any one of claims 3 to 8, wherein the semiconductor layer is an amorphous semiconductor layer including at least one of hydrogen and halogen.

15. The display device according to any one of claims 3 to 8, wherein the semiconductor layer is a semi-amorphous semiconductor layer including at least one of hydrogen and halogen.

16. The display device according to any one of claims 3 to 8, wherein the semiconductor layer is a polycrystalline semiconductor including at least one of hydrogen and halogen.

17. The display device according to any one of claims 3 to 8, wherein a channel length of the semiconductor layer is

from 5 μm to 100 μm .

18. A television apparatus including the display device according to any one of claims 3 to 8 as a display screen.

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19. A television apparatus including a display device with the thin film transistor according to claim 1 or 2 as a display screen.

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20. A method for manufacturing a display device comprising the steps of:

forming an insulating layer having a first opening;
forming a first conductive layer in the first opening;

and

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forming a second conductive layer over the insulating layer and the first conductive layer by a droplet discharge method using a first conductive material,

wherein the first conductive layer is formed to be wider and thicker than the second conductive layer.

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21. A method for manufacturing a display device comprising the steps of:

forming a first insulating layer having a first opening;

forming a first conductive layer in the first opening;

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forming a second conductive layer by a droplet discharge method using a first conductive material on the first insulating layer and the first conductive layer;

forming a semiconductor layer over the second conductive layer with a gate insulating film therebetween;

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forming a third conductive layer over the semiconductor

layer by a droplet discharge method using a second conductive material;

forming a second insulating layer over the third conductive layer; and

5 forming a fourth conductive layer over the third conductive layer,

wherein the first conductive layer is formed to be wider and thicker than the second conductive layer, and

wherein the fourth conductive layer is formed to be
10 thicker than the third conductive layer.

22. A method for manufacturing a display device comprising the steps of:

forming a first insulating layer having a first opening;
15 forming a first conductive layer in the first opening;
forming a second conductive layer by a droplet discharge method using a first conductive material on the insulating layer and the first conductive layer;

forming a semiconductor layer over the second conductive
20 layer with a gate insulating film therebetween;

forming a third conductive layer over the semiconductor layer by a droplet discharge method using a second conductive material;

forming a first electrode over the third conductive
25 layer;

forming an electroluminescent layer over the first electrode; and

forming a second electrode over the electroluminescent layer,

30 wherein the first conductive layer is formed to be wider

and thicker than the second conductive layer.

23. A method for manufacturing a display device comprising the steps of:

- 5 forming a first insulating layer having a first opening;
 forming a first conductive layer in the first opening;
 forming a second conductive layer by a droplet discharge
method using a first conductive material on the insulating layer
and the first conductive layer;
- 10 forming a semiconductor layer over the second conductive
layer with a gate insulating film therebetween;
 forming a pair of third conductive layers over the
semiconductor layer by a droplet discharge method using a second
conductive material;
- 15 forming a first electrode over one of the pair of third
conductive layers;
 forming a second insulating layer over the other one of
the third conductive layer;
 forming a fourth conductive layer over the other one of
20 the third conductive layer;
 forming an electroluminescent layer over the first
electrode; and
 forming a second electrode over the electroluminescent
layer,
- 25 wherein the first conductive layer is formed to be wider
and thicker than the second conductive layer.

24. The method for manufacturing the display device
according to any one of claim 20 to 23, the method further
30 comprises the step of forming a titanium oxide film below the

first conductive layer.

25. The method for manufacturing the display device according to any one of claim 20 to 23, the method further
5 comprises the step of forming a film comprising at least one selected from the group consisting of W (tungsten), Al (aluminum), Ta (tantalum), Zr (zirconium), Hf (hafnium), Ir (iridium), Nb (niobium), Pd (lead), Pt (platinum), Mo (molybdenum), Rh (rhodium), Sc (scandium), Ti (titanium), V
10 (vanadium), Cr (chromium), Mn (manganese), Fe (iron), Co (cobalt), Ni (nickel), Cu (copper), and Zn (zinc) below the first conductive layer.

26. The method for manufacturing a display device
15 according to any one of claims 20 to 23, wherein the first conductive material is one selected from the group consisting of silver, gold, copper, and indium tin oxide.

27. The method for manufacturing a display device
20 according to claim 22 or 23, wherein the second conductive material is one selected from the group consisting of silver, gold, copper, and indium tin oxide.

28. The method for manufacturing the display device
25 according to any one of claims 20 to 23, wherein the first opening is formed to have a width of from 5 μm to 100 μm .

29. The method for manufacturing the display device according to any one of claims 21 to 23, wherein the
30 semiconductor layer is an amorphous semiconductor layer formed

from a gas including at least one of hydrogen and halogen.

30. The method for manufacturing the display device according to any one of claims 21 to 23, wherein the
5 semiconductor layer is a semi-amorphous semiconductor layer formed from a gas including at least one of hydrogen and halogen.

31. The method for manufacturing the display device according to any one of claims 21 to 23, wherein the
10 semiconductor layer is a polycrystalline semiconductor layer formed from a gas including at least one of hydrogen and halogen.

32. The method for manufacturing the display device according to any one of claims 21 to 23, wherein the second
15 conductive layer is formed so that a channel length of the semiconductor layer is from 5 μm to 100 μm .